

**Forestry-Riparian, Decision Rationale****C. ADDITIONAL MANAGEMENT MEASURES – FORESTRY**

**PURPOSE OF FINDING:** The purpose of this finding is to document whether the forestry-related management measures in Oregon’s Coastal Nonpoint Source Control Program address deficiencies identified by NOAA and the EPA in previous programmatic reviews, and the extent to which those measures are now adequate to restore and protect coastal waters consistent with section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (CZARA).

**CONDITION FROM JANUARY 1998 FINDINGS:** Within two years, Oregon will identify and begin applying additional management measures where water quality impairments and degradation of beneficial uses attributable to forestry exist despite implementation of the 6217(g) measures.

**PROPOSED FINDING: Condition Not Met****RATIONALE:**

*Protection of Riparian Areas:* Oregon relies on both regulatory and voluntary measures to provide riparian protections for medium and small fish bearing streams (type “F” streams) and non-fish bearing streams (type “N” streams). Generally, under the current Forest Practices Act (FPA) rules, no tree harvesting is allowed on private lands within 20 feet of fish bearing streams, or medium and large non-fish bearing streams,. Also, all snags and downed wood that do not represent a safety or fire hazard, must be retained within riparian management areas around small and medium fish bearing streams (from the stream edge out to 50 or 70 feet, respectively). In addition, the FPA rules establish basal area targets for some riparian management areas. For example, along medium fish bearing streams, there is a requirement to leave 30 trees (at least 8 inches DBH) per 1000 feet. Oregon has no vegetation retention requirements for small non-fish bearing streams in the Coast Range and Western Cascades.

In addition to regulatory requirements, the Forestry industry has adopted voluntary measures to protect riparian areas for high aquatic potential streams (i.e., streams with low gradients and wide valleys where large woody debris recruitment is most likely to be effective at enhancing salmon habitat). These voluntary measures include large wood placement, retaining additional basal area within stream buffers, large tree retention, and treating large and medium sized non-fish streams the same as fish streams for buffer retentions.<sup>1</sup>

However, based on the results of a number of studies including those summarized below, NOAA and EPA find that additional management measures (beyond those in FPA rules and the voluntary program), for forestry riparian protection around medium and small fish bearing streams and non-fish bearing streams are necessary to attain and maintain water quality standards and to protect designated uses. Therefore, per the condition on the federal agencies earlier approval of Oregon’s coastal nonpoint program under CZARA, Oregon must still adopt additional management measures applicable to the forestry land use and forested areas in order to protect small and medium fish bearing streams and non-fish bearing streams from pollution attributable to forestry practices in riparian areas.

<sup>1</sup> According to Oregon’s March 2014 coastal nonpoint program submittal, information on voluntary efforts was reported to the Oregon Watershed Restoration Inventory. <http://coastalmanagement.noaa.gov/nonpoint/oregonDocket/StateofOregonCZARAsubmittal3-20-14.pdf>

A significant body of science, including: 1) the Oregon Department of Forestry's (ODF) Riparian and Stream Temperature Effectiveness Monitoring Project (RipStream)<sup>2</sup>; 2) "The Statewide Evaluation of Forest Practices Act Effectiveness in Protecting Water Quality" (i.e., the "Sufficiency Analysis")<sup>3</sup>; and 3) the Governor's Independent Multidisciplinary Science Team (IMST) Report on the adequacy of the Oregon forest practices in recovering salmon and trout<sup>4</sup>, indicates that riparian protection around small and medium fish bearing streams and non-fish bearing streams in Oregon is not sufficient to protect water quality and beneficial uses.

As early as 1999, the IMST study found that the FPA rule requirements related to riparian buffers and large woody debris needed to be improved. Based on its scientific analysis, the IMST team concluded, "...the current site-specific approach of regulation and voluntary action is not sufficient to accomplish the recovery of wild salmonids."<sup>5</sup> The IMST team made the following recommendations: 1) because non-game fish and other aquatic organisms play a role in a functioning stream system, and the distribution of salmonids will change over time, non-fish bearing streams should be treated no differently from fish-bearing streams when determining the buffer width protections<sup>6</sup>; 2) there should be an increase in the basal area and requirements for riparian management areas for both small and medium streams, regardless of the presence of fish; and 3) there should be an increase in the number of trees within the riparian management area for both fish and non-fish bearing small and medium streams.<sup>7</sup>

The 2002 Sufficiency Analysis found that the Oregon FPA's prescribed riparian buffer widths for small and medium fish bearing streams may be inadequate to prevent temperature impacts. That analysis concluded: 1) FPA Standards for some medium and small Type F streams in western Oregon may result in shortterm temperature increases at the site level; and 2) FPA standards for some small Type N

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<sup>2</sup> Three peer-reviewed articles present the results of the RipStream analysis:

Dent, L., D. Vick, K. Abraham, S. Shoenholtz, and S. Johnson. 2008. Summer temperature patterns in headwater streams of the Oregon Coast Range. *Journal of the American Water Resources Association* 44: 803-813.

Groom, J.D., L. Dent, and L.J. Madsen. 2011. Stream temperature change detection for state and private forests in the Oregon Coast Range. *Water Resources Research* 47: W01501, doi:10.1029/2009WR009061.

Groom, J.D., L. Dent, and L.J. Madsen. 2011. Response of western Oregon stream temperatures to contemporary forest management. *Forest Ecology and Management*, doi:10.1016/j.foreco.2011.07.012

<sup>3</sup> Oregon Department of Forestry and Oregon Department of Environmental Quality. 2002. Sufficiency Analysis: A Statewide Evaluation of Forest Practices Act Effectiveness in Protecting Water Quality, Oregon Department of Forestry and Oregon Department of Environmental Quality. October 2002.

<sup>4</sup> Independent Multidisciplinary Science Team. 1999. Recovery of Wild Salmonids in Western Oregon Forests: Oregon Forest Practices Act Rules and the Measures in the Oregon Plan for Salmon and Watersheds. Technical Report 1999-1 to the Oregon Plan for Salmon and Watersheds, Governor's Natural Resources Office, Salem, Oregon.

<sup>5</sup> Independent Multidisciplinary Science Team. 2.

<sup>6</sup> Ibid. 21 and 43.

<sup>7</sup> Ibid. 44-45.

streams may result in short-term temperature increases at the site level that may be transferred downstream (this may impact water temperature and cold-water refugia) to fish-bearing streams.<sup>8</sup>

The 2011 RipStream reports found that FPA riparian protections on private forest lands did not ensure achievement of the Protection of Cold Water criterion (PCW) under the Oregon water quality standard for temperature.<sup>9</sup> <sup>10</sup>The PCW criterion prohibits human activities, such as timber harvest, from increasing stream temperatures by more than 0.3°C at locations critical to salmon, steelhead or bull trout. The RipStream analysis found that the chance of a site managed using FPA rules exceeding the PCW criterion between a pre-harvest year and a post-harvest year was 40%.<sup>11</sup> <sup>12</sup>

The RipStream study also found that stream temperature fluctuations increased, in part, with a reduction in shade, and that shade was best predicted by riparian basal area and tree height. The findings suggest that riparian protection measures that maintain higher shade (such measures found on state forest land) are more likely to maintain stream temperatures similar to control conditions.<sup>13</sup>

In 2013, the EPA, together with the USGS and the BLM, sought to summarize pertinent scientific theory and empirical studies to address the effects of riparian management strategies on stream function, with a focus on temperature<sup>14</sup>. With regard to no-cut buffers adjacent to clearcut harvest units, that paper noted that substantial effects on shade have been observed with “no-cut” buffers ranging from 20 to 30 meters<sup>15</sup>, and small effects have been observed in studies that examined “no-cut” buffer widths of 46 meters wide<sup>16</sup>. For “no-cut” buffer widths of 46-69 meters, the effects of tree removal on shade and temperature were either not detected or were minimal<sup>17</sup>. The paper also found that at “no-cut” buffer

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<sup>8</sup> Oregon Department of Forestry and Oregon Department of Environmental Quality. 44-45.

<sup>9</sup> Groom, J.D., Dent, L., Madsen, L.J. 2011. “Stream temperature change detection for state and private forests in the Oregon Coast Range”. WATER RESOURCES RESEARCH, VOL. 47, W01501, 12 PP., 2011.

<sup>10</sup> Groom, J.D., 2011. “Update on Private Forests Riparian Function and Stream Temperature (RipStream) Project”. Staff Report; November 3, 2011.

<sup>11</sup> Ibid. 2.

<sup>12</sup> Groom, J.D., Dent, L., Madsen, L.J., 2011. “Stream temperature change detection for state and private forests in the Oregon Coast Range”. WATER RESOURCES RESEARCH, VOL. 47, W01501, 2 PP., 2011.

<sup>13</sup> Ibid.2. 3. .

<sup>14</sup> Leinenbach, P., McFadden, G., and C. Torgersen. 2013. Effects of Riparian Management Strategies on Stream Temperature. Prepared for the Interagency Coordinating Subgroup (ICS). 22 pages. Available upon request.

<sup>15</sup> Brososke et al. 1997, Kiffney et al. 2003, Groom et al. 2011b as cited in Leinenbach et al. 2013.

<sup>16</sup> Science Team Review 2008, Groom et al. 2011a as cited in Leinenbach et al. 2013.

<sup>17</sup> Anderson et al. 2007, Science Team Review 2008, Groom et al. 2011a, Groom et al. 2011b as cited in Leinenbach et al. 2013

widths of less than 20 meters, there were pronounced reductions in shade and increases in temperature, as compared to wider buffer widths. The most dramatic effects were observed at the narrowest buffer widths (less than or equal to 10 meters)<sup>18</sup>. As noted above, existing FPA buffers for small and medium fish require only 20 foot (~7 meter) “no-cut” buffers within a riparian management zone of ~17 to ~23 meters, and no vegetation retention is required on small non-fish streams in the Coast Range and Western Cascades.

Oregon also has been investing in three paired watershed studies<sup>19</sup>. These studies are designed to analyze the effects of timber harvesting on a watershed and reach scale. Several commenters have cited the paired watershed study as evidence that the current FPA practices for riparian protection are effective at achieving water quality standards and protecting designated uses. Unpublished preliminary data from the Hinkle Creek study indicate that changes in stream temperature after timber harvesting along non-fish bearing streams were variable. In addition, there was no measureable downstream effect on temperatures.<sup>20</sup> However, the variation in stream temperature and overall net observed temperature decrease may be attributable to increased slash debris along the stream after harvest, as well as a likely increase in stream flow post-harvest that could prevent an increase in temperatures and contribute to lower mean stream temperatures.<sup>21</sup> Therefore, there may be other factors at play that make it difficult to draw any definitive conclusions about the adequacy of the FPA practices from the Hinkle Creek results. In its evaluation of the study results, DEQ concluded that temperature data from the Hinkle Creek and Alsea River studies show that for fish-bearing streams, temperature increases downstream from the harvest sites were very similar to the increases found in the RipStream study.<sup>22</sup>

NOAA and EPA acknowledge that Oregon is working to address some of the inadequate riparian protection measures in the FPA. The Oregon Board of Forestry (Board) has the authority to regulate forest practices through administrative rule making and could require changes to the FPA rules to protect small and medium fish bearing streams. The Board, recognizing the need to better protect small and medium fish bearing streams, directed ODF to undertake a rule analysis process that could lead to revised riparian protection rules. At its September 2014 meeting, the Board voted unanimously in favor of continuing to analyze what changes might be needed in the Oregon Forest Practice Rules to provide greater buffer protection for medium and small fish bearing streams on private forest lands. NOAA and EPA encourage the State to move forward with this rule making process expeditiously. Until more

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<sup>21</sup> Kibler, K.M. 2007. The Influence of Contemporary Forest Harvesting on Summer Stream Temperatures in Headwater Streams of Hinkle Creek, Oregon. Thesis for the degree of Master of Science in Forest Engineering presented on June 28, 2007. Oregon State University. [http://watershedsresearch.org/assets/reports/WRC\\_Kibler,Kelly\\_2007\\_Thesis.pdf](http://watershedsresearch.org/assets/reports/WRC_Kibler,Kelly_2007_Thesis.pdf)

<sup>22</sup> Seeds, J., Mitchie, R., Foster, E., ODEQ, Jepsen, D. 2014. “Responses to Questions/Concerns Raised by Oregon Forestry Industries Council Regarding the Protecting Cold Water Criterion of Oregon’s Temperature Water Quality Standard”, Oregon Department of Environmental Quality and Oregon Department of Fish and Wildlife Memo. 06/19/2014

protective FPA rule changes are adopted, the federal agencies would not consider them as part of the State's coastal nonpoint program.

## **Ex. 5 - Deliberative**

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<sup>23</sup> Independent Multidisciplinary Science Team. 1999.

## Forestry-Riparian, Decision Rationale

### C. ADDITIONAL MANAGEMENT MEASURES – FORESTRY

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**Comment [CJ1]:** Is this restriction just for private lands?

**Comment [HA2]:** The buffers are different for federal lands and may be different for forest lands owned and managed by the State.

In addition to regulatory requirements, the Forestry industry has adopted voluntary measures to protect riparian areas for high aquatic potential streams (i.e., streams with low gradients and wide valleys where large woody debris recruitment is most likely to be effective at enhancing salmon habitat). These voluntary measures include large wood placement, retaining additional basal area within stream buffers, large tree retention, and treating large and medium sized non-fish streams the same as fish streams for buffer retentions.<sup>1</sup>

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The RipStream study also found that stream temperature fluctuations increased, in part, with a reduction in shade, and that shade was best predicted by riparian basal area and tree height. The findings suggest that riparian protection measures that maintain higher shade (such measures found on state forest land) are more likely to maintain stream temperatures similar to control conditions.<sup>13</sup>

**Comment [KT3]:** The analysis also showed that they didn't harvest as aggressively as they could have under the state FMP.

In 2013, the EPA, together with the USGS and the BLM, sought to summarize pertinent scientific theory and empirical studies to address the effects of riparian management strategies on stream function, with a focus on temperature<sup>14</sup>. With regard to no-cut buffers adjacent to clearcut harvest units, that paper noted that substantial effects on shade have been observed with "no-cut" buffers ranging from 20 to 30 meters<sup>15</sup>, and small effects have been observed in studies that examined "no-cut" buffer widths of 46 meters wide<sup>16</sup>. For "no-cut" buffer widths of 46-69 meters, the effects of tree removal on shade and temperature were either not detected or were minimal<sup>17</sup>. The paper also found that at "no-cut" buffer

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<sup>16</sup> Science Team Review 2008, Groom et al. 2011a as cited in Leinenbach et al. 2013.

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NOAA and EPA acknowledge that Oregon is working to address some of the inadequate riparian protection measures in the FPA. The Oregon Board of Forestry (Board) has the authority to regulate forest practices through administrative rule making and could require changes to the FPA rules to protect small and medium fish bearing streams. The Board, recognizing the need to better protect small and medium fish bearing streams, directed ODF to undertake a rule analysis process that could lead to revised riparian protection rules. At its September 2014 meeting, the Board voted unanimously in favor of continuing to analyze what changes might be needed in the Oregon Forest Practice Rules to provide greater buffer protection for medium and small fish bearing streams on private forest lands. NOAA and EPA encourage the State to move forward with this rule making process expeditiously. Until more

**Comment [KT4]:** This is a little confusing because we say just above that this study demonstrates a net temperature decrease in response to harvest. Could we reword?

**Comment [CJ5]:** Meaning what? What is the significance of this finding?

**Comment [HA6]:** It is to show that the findings from the two studies on this particular issue are consistent – nothing more or nothing less

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protective FPA rule changes are adopted, the federal agencies would not consider them as part of the State's coastal nonpoint program.

## Ex. 5 - Deliberative

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